G.R.S. IX-5]

Previous references.

192 .

( )

File No. 94-21 A.

Serial Nos. 1-20

Later references.

GENERAL AND REVENUE SECRETARIAT.

Serial Nos. 1-20.

Part B for September 22

SUBJECT

Inventin no 17/21-22 for "Riggent for concentration of ore by floatin & mellod & and process of manig ent same" by Leekenbath Processes Incorporated, Manufacturers, 57 Post Street, San Francisco, California, U.S.A.

1782 & 18-9-22.

L. the examiner, Mysore Gazette. Notified ent filing of ent specifica.

Printed on the Multigraph.

AG.

G.R.S. 57.]

File No.

Serial Nos.

190

GENERAL AND REVENUE SECRETARIAT.

( )

Part A: Manuscript
for

Serial Nos.

GPB—5,000—20-3-06.

2838
2450
1033.

G. R. S. III-2

General and Revenue Secretariat. I & C File No. 94 of 1921.

Serial No.	
3	To the Secy, Bd of Sc Advice. No 1799 dy 17-9-21. Forwards his application for the opinion of his Board.
4	From the same office. No 114 dy 10-11-21. States that his application referred to does not contain drawings meant to illustrate his invention & requests that the same may be obtained. Submitted with a draft. ADS 17-11-21.
5	To Messrs H.V. Williams & Co, Calcutta. No 3066 dy 24-11-21. Requests that his drawings referred to may be forwarded.
6	From the same company. Letter dy 2-12-21. States that Sheet 3 has been withdrawn from his specification & requests that his application may be considered without reference to drawings. Submitted with a draft. ADS 12-12-21.

NOTE—Contn. sheet.

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G.R.S. III—3]

Invention no 17/21-22
I & C 94-21.

Routine Notes

[To be used only for notes, requisitions, etc., not intended for permanent record.]

Y

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9 The applicants have stated in their application submitted on 11-8-1921, that no application has at any time been made for a patent in the United Kingdom or in British India in respect of the Invention. But they have forwarded with their letter dt 8-5-22 a copy of the Specification dt 29-9-20 which was accepted by the Govt of India on 15-8-21. This shows that the statement made in the application is not true. Submitted for orders as to whether the drafts may issue.

ATS
22/5/22

23/5/22

10 Return the appln: for it rectified, pending entrance

23/5

11 Submitted with a draft

ATS
25-5-22

25/5/22

To Messrs H.V. Williams & Co Calcutta
6045 dt 9-6-22 25/5
returning the original application for necessary corrections & resubmission.

10

N.B.—Should routine notes be written on small slips, the notes must be copied, or slips pasted on this form.

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G.R.S. III—3]

9 & 94-21. **Routine Notes.**

[To be used only for notes, requisitions, etc., not intended for permanent record.]

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11 From Messrs H.V. Williams & Co Calcutta
Letter dt 14-6-22
Submits a fresh application requiring the required information.
Returned for orders as to whether the drafts in the file may be returned
ADS
22-6-22
Mr. Row 785M
23/6. Secd B,

12 To Messrs H.V. Williams & co, Calcutta.
6428 dt 30-6-22
Authorising the selling of the specification.

13. To Messrs H.V. Williams & co, Calcutta.
6429 dt 30-6-22.
Forwards a copy of 12.
Post

V.B.—Should routine notes be written on small slips, the notes must be copied, or slips pasted on this form.

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G. R. S. III-2]

General and Revenue Secretariat. | I T C File No. 94 of 19 21.

Serial No.	
14	From Messrs H. V. Williams & Co, Calcutta 5998 & 18-7-22. Forwards copies of the Specification & advises remittance of filing fee of Rs 30/-
	The copies of Specification now forwarded do not contain the full information found in the Specification originally submitted by the applicants vide pp. 16 and onwards.
V. C.	May the applicants be requested to revise the Specification now sent & resubmit the same. Submitted for orders.
	HHS 26-7-22 VS
	Yes - all 3 new copies may now be carefully compared
attended to.	
	15 Submitted with a draft. HHS 1-8-22 VS
15	To. Messrs. H. V. Williams. Calcutta. No Dc. 926 dt 5-8-22. Returns the copies of the specifications for revision and resubmission.
16	From Messrs H. V. Williams Calcutta In reply to Sl 15, state that the specifications have been drawn to agree identical with that accepted in India and request for the duplicate copy of the specifica

NOTE—Contn. sheet.

Serial No.

originally filed, so as to make necessary revision in the copies.

Out of the 2 copies received, one has been pasted to the Register and the other is in the file. No spare copies are available. Submitted for orders if the copy in the file may be sent to the firm, as requested.

May be sent

Draft forwarding papers.

17 To Messrs H.V. Williams & Co, Calcutta.
1243 dt 21-8-22

Forwards the original copy of the specification & requests that the same may be returned when done with.

18 From Messrs H.V. Williams & Co.
Letter dt 26-8-22

Returns the original copy of the specification together with five other copies of the same.
Submitted with three drafts. The draft & facts of Govt order (Sl no 12) require signature. The F. & R. daily entered is also submitted.
Notes.
9-9-22

NOTE—Contn. sheet.

H. V. WILLIAMS,
MEMBER,
CHARTERED INSTITUTE
OF
PATENT AGENTS, LONDON.

BANKERS:
CHARTERED BANK OF INDIA,
AUSTRALIA AND CHINA;
LONDON AND CALCUTTA.

H. V. Williams & Co.,

CABLES AND TELEGRAMS:—
"LOFZANG," CALCUTTA.
CODES: { A. B. C. 5TH EDITION,
PATENTS, B SINGER'S.

Telephone No. 1170.

06193 *Patent Agents & Engineers,*

8, Esplanade East,

GEN & REV. SECT. J & C Coll. 14 AUG 1921

Our Reference No.

Your Reference No.

CALCUTTA, 11th August 1921

The Chief Secretary

to the Government of H. H. The

Maharaja of Mysore

General and Revenue Secretariat

Bangalore

Sir,

Not received

We have the honour to forward herewith an application for a patent in Mysore in the name of LUCKENBACH PROCESSE Incorporated for their invention for "Reagent for concentrations of ore by floation and method and process of using the same"

We also forward by money order the sum of Rs 10/- and beg that the order granting leave to file the specifications being sent to us at your early convenience.

We have the honour to be

Sir,

Your most obedient servants

H. V. Williams & Co

Cash Rect to the note of the Account has since been received

A sum of Rs 40/- has been received from messrs. H. V. Williams & Co on 11.8.21 It is not known whether the above amount is included in this

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Received by Regd Post.

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POWER OF ATTORNEY

GEN & REV. SECTT.
17 AUG 1921

IN THE MATTER of the Inventions and Designs Regulation, XI of 1894, of the Government of Mysore:

and

IN THE MATTER of Luckenbach Processes, Incorporated, a corporation organized under the laws of the State of Nevada, with offices at 57 Post Street, San Francisco, California, United States of America, Manufacturers.

We, the above named Luckenbach Processes, Incorporated, do hereby retain nominate constitute and appoint Messrs. H. V. Williams & Co., Patent Agents & Engineers, of 8 Esplanade East, Calcutta, India, as our Agents and Attorneys to apply for and obtain from the Government of Mysore an Exclusive Privilege for Reagent for concentration of ore by floatation and method and process of using the same.

and to maintain the same in force; and we authorize them to sign our name to such papers and writings and do such acts including substitution and revocation as may be necessary or expedient. And lastly, we request that all notices requisitions and communications now or hereafter relating to the same may be sent to such Agents at the above address and that they be recognized as our authorized agents in all proceedings incident thereto.

Dated this 20th day of June A.D. 1921.

Luckenbach Processes Inc
by Harry de L Cebrian
Pres.

Signed, sealed and delivered at
by the above named } Witnesses.
in the presence of

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The invention relates to the concentration of ores for the recovery of the valuable mineral content thereof from the valueless earthly or rocky gangue with which they are associated in nature, by the flotation process, wherein the ore in finely divided state is mixed with water to form a pulp, which is then aerated or gasified in the presence of a material which will form bubbles in the water to which mineral particles will adhere, and be floated to the surface of the pulp and form a froth thereon, while the gangue will not be acted on by the material, or will be repelled thereby, and will sink to the bottom. The mineral bearing froth is removed from the surface, and the values are recovered.

The present invention is based on the discovery of new frothing and mineral gathering agents, and combinations or mixtures of the same, by means of which a higher percentage of recovery of values than in the present flotation process may be secured. The present invention is applicable to all of the mineral compounds capable of concentration by the flotation processes at present in

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use, and by its use it is possible to recover certain free or native metals, and the carbonates, oxides and silicates of certain metals, as well as the sulphides thereof.

In addition to recovering metallic minerals and their compounds, certain non-metallic minerals, such for example, as graphite, elemental sulphur, etc., may be floated and concentrated.

The object of the invention is to provide a simple cheap and efficient reagent which may be introduced directly into the pulp without previous agitation, which will have a high preferential affinity for the mineral content of the ore, will produce a thick, heavy, close grained, tenacious froth which will float the mineral particles to the surface of the pulp, and which will not only float the mineral compounds recoverable by the oil flotation processes, but will act on metals and mineral compounds which cannot be floated by the oil flotation processes at present in use.

A further object is to produce a frothing reagent which may be employed in connection with the oily gathering materials of the oil flotation processes, which is cheaper than the frothing oils at present employed, and which by its own gathering properties will assist in the gathering operation to a greater extent than do the frothing oils at present in use.

These and further objects will more fully appear in the following specification and claims.

The invention involves the use of rosin pitch or wood tar pitch or bombinations of two or more pitches in a colloidal solution, as the frothing and gathering agent.

Pitch, as defined in this specification, is a solid residum from the dry or destructive distillation of rosin or of wood tar, and may, it is believed, be obtained from all kinds of wood, but the preferred pitch is that resulting from the destructive distillation of the rosin which is itself the residue of the steam distillation of pine latex.

In the practise of the invention the pitch is dissolved by mixing the same with a pitch solvent. As far as at present known, any solvent of rosin pitch may be employed. The following substances have been employed with good results, caustic soda, caustic potash, the carbonates and bicarbonates of sodium and potassium, ammonia, the salts of ammonium and the phosphates of sodium and potassium in combination with certain of the foregoing, carbon di sulphide, alcohol, acetone and various combinations of the same.

The proportions of the pitch and the solvent may vary within wide limits as depends upon the kind of ore to be concentrated, and for different grades or different compounds of the same ore.

The preferred solvent is an aqueous solution of caustic soda, or of caustic soda and carbonate of soda. The soda solution is first made, and a small proportion of rosin pitch is boiled in the solution until the mixture is

reduced to a syrup-like consistency. This mixture may be termed the stock solution, and may be thinned by the addition of hot water to the consistency required in, what may be called, the reagent for use in the pulp.

In making up the frothing and selecting composition or mixture, a reagent solution is first prepared. This solution is formed by dissolving an alkali, preferably caustic soda, in water. To the alkali water is preferably added a metallic salt, such for example a carbonate of soda, phosphate of soda, etc.

If desired, and in some situations it may be preferable, the alkali may be omitted, and the water treated with a salt alone. In this case the more or less alkalinity of the salt will be relied upon to render the solution alkaline, it being understood that a great amount of the salt will be required than when the caustic soda is employed in the mixture.

If desired an oxidizing agent may be added to the stock solution during its compounding. Such an oxidizing agent is peroxide of hydrogen, and a small proportion of a weak solution of the same in water, added to the pitch-alkali mixture before or during the boiling will cause the pitch to more readily go into solution and increases the frothing and gathering qualities of the reagent.

For working some forms of ore, such for example as those carrying iron compounds which are not desired in the concentrate, ammonia, or its compounds, may be added to the pitch-soda mixture. The ammonia will add to the alkalinity of the reagent, and in connection with certain ores the

The proportions of the various ingredients in the reagent may be varied within wide limits. The reagent may be compounded in concentrated form for economy in transportation and may be diluted as required. The operator will know by the appearance of the froth on the surface of the pulp as to the quantity of the reagent required. If the froth is thin, weak and watery, or if the froth is lightly mineralized, the proportion of the reagent to the pulp must be changed.

In making up the reagent above described a minute proportion of silicate of soda may be added during the compounding, or the same may be added to the complete reagent mixture or to the pulp before, during or after the reagent is added. The silicate of soda acts to prevent the silicious gangue from floating with the mineral values, and will also tend to keep any iron compound, which may be present, from rising.

While the reagent above described is free of oil, or oleaginous material, it may be used in conjunction with such materials, and its use as a frothing agent in connection with any of the well known oils or oily substances of the oil flotation processes is superior to the frothing oils at present in use.

When used with an oily gathering agent, such for example, as a mixture of coal tar and coal tar creosote, the tarry mixture may be beaten into the pulp as is common, and the frother comprising the reagent of the invention, may be added to the pulp as desired. This is a distinct improvement over present oil flotation processes for the reason that in the latter the frothing oil must be beaten into the pulp to form an emulsion, and it is highly impracticable to beat the gathering oil into the pulp and subsequently beat the frothing oil in.

The employment of the pitch reagent in conjunction with the oils of the present flotation processes will not only produce the advantages above described, but will impart to the oil, or oily substance the added quality of selecting and gathering native metals, carbonates, oxides and silicates as well as the sulphides of the metals.

A general indication or approximation of the proportions of the various ingredients of the reagent is as follows:

No. 1. Pitch - - - - - - - - - - 6 oz.
Caustic soda solution 1-1/2 pints

The reagent solution is preferably made by dissolving 8 oz. of caustic soda in 2 gallons of water.

The mixture is boiled until the pitch has become liquefied, and the mass has the consistency of syrup. The syrup-like liquid may be thinned as desired to form the working mixture. As an extremely small quantity of the active material (pitch) is required in the flotation process, the thinner the working mixture the easier it will be to measure the active material placed in the pulp. If the working mixture be in concentrated form, as above, the amount used per ton of ore must be measured in cubic centimeters, while if the mixture be diluted enough, it may be measured in larger quantities and nicety of measuring will not be required.

If desired an oxidizing agent, such for example as hydrogen peroxide may be added to the above reagent. This will cause rapid dissemdnation of the pitch, and a cleaner concentrate will be secured.

Instead of caustic soda as the pitch solvent, a salt of such alkaline metal, **such** as sodium carbonate, or a mixture of the alkali and the salt, may be used.

When ammonia is employed as the pitch solvent, the following is the general or approximate formula.

No. 2	Pitch - - - - - - - - - - - -	2 oz.
	Ammonia (12-1/2%) - - - - -	1-1/2 oz.
	Permanganate of Potash sol. - - - - - - - - - - -	1 oz.
	Water - - - - - - - - - - - -	4 oz.

Heat and mix thoroughly until the pitch is dissolved, and dilute with hot water to the consistency desired.

The permanganate of potash solution may be made by dissolving 8 grams of permanganate of potash in 1 quart of hot water.

In making a frothing and gathering reagent by the use of an oil or oily substance the following example with coal tar and coal tar creosote as the oil, is given, it being understood that any of the known gathering oils or combinations of the same may be employed instead of coal tar and creosote.

No. 3.	Coal tar- - - - - - - - -	5 cc
	Coal tar creosote - - - -	5 cc
	Pitch - - - - - - - - - -	15 grams
	Caustic soda - - - - - - -	5 grams
	Silicate of soda - - - -	2-1/2 cc
	Water - - - - - - - - - -	200 CC

The caustic soda is dissolved in the water and the silicate of soda is added. The coal tar and creosote are mixed. The pitch is added to the soda solution and the mixture is boiled until the pitch is liquefied. This mixture is allowed to cool. The mixture of tar and creosote is stirred into the cool mixture and when it is thoroughly mixed, the mass is diluted by the admixture of 200 cc of water. The tar and creosote may be added to the cool pitch mixture, but it is preferable to make the addition while the pitch mixture is still warm. This is the frothing and gathering reagent.

Instead of using coal tar or coal tar creosote, as in example No. 3, water-gas tar may be employed as follows:-

No. 5	Pitch----------	50 grams
	Water-gas tar----------	30 cc
	Caustic soda----------	10 cc
	Silicate of soda-------	2.5 cc
	Water----------	1 liter

The water-gas tar, pitch and soda are melted together with hot water is added slowly. The silicate of soda may be melted with other ingredients, but is preferably added after the hot water.

Carbonate of soda may be used instead of caustic soda in which case 20 cc will be used. If both caustic and carbonate are employed the proportion may be 5 CC of the former and 10 cc of the latter.

The water-gas tar may be used in addtiion to coal tar and creosote or with either inabout equal proportions.

Any of the above reagents may be acidified by the addition of a 10% solution of a mild acid, such for example as boric acid.

The pitch in all of the examples given, while dissolved and in liquid form is not in true solution, butis in what may be termed a colloidal or semi-colloidal solution as distinguished from a true solution. The exact condition and state of the mixture is not known to applicant, and the above theory is to the best of his present knowledge and belief.

In use an extremely small quantity of the active material is added to the pulp and apparently the smaller the amount of the active material, within certain limits, the better will be the extraction.

The density of the pulp may vary. In working some ores it may be 2-1/2 parts water to 1 part ore, while with others it may be as high as 5 or 6 parts water and 1 part of ore.

of the metals, as well as the sulphides.

If desired a small proportion of alum may be added to any of the above reagents with beneficial results in working certain ores.

A small proportion of casein, dissolved in a slightly alkaline water, may be added to any of the above reagents. The casein apparently has a fixing effect on the solid or colloidal matters in the mixture, and prevents precipitation.

As an example of the results obtained in the flotation process of the present invention, the No. 3 reagent was used with 1500 grams of a chalcopyrite and bornite copper ore from the Derby Mine, of Virgilina, Va. with a pulp composed of ore 1 part, and water 4 parts, in a Janney test machine on a run of 15 minutes duration. The result was as follows:-

	Weight	Grams	% Cu.	Con. Grams	% of Tota
Heads	1500.	00	4.08	61.20	100
1st Concentrate	122.	80	44.05	54.09	88.3
2nd Concentrate	34.	80	12.11	4.21	6.8
Middlings	270.	20	.65	1.76	2.8
Tails	1070.	60	.08	.86	1.4
Recovery	1498	40		87.92	97.9

This test showed a total concentration of 97.9% copper.

The machine used has a capacity for one third of the pulp operated on and pulp was put through in three batches, three runs for each batch. The machine was washed between

each batch which accounts for the loss of 0.7% of the copper which adhered to the machine and in the pipes and was washed out. In a larger machine a portion, at least, of these lost values would have been recovered in the concentrates.

In a test in which the No. 1 reagent was modified by using 30 grams of carbonate of soda instead of the caustic soda, on a sample of surface ore from the Navajo Mine near Flagstaff, Arizona. This ore carries carbonate of copper but no sulphides of copper. The test was made using 100 grams of ore in a Janney laboratory machine, and showed the following result.

Heads	4.21% copper
Concentrate	14.38% "
Tails	0.128% "

The recovery, in the concentrate was 28 grams, and the extraction therefore indicates a recovery of 95.6% of the copper content of the ore.

A test run of 100 grams of the same ore, and using the No. 2 reagent produced the following result.

Heads	100 grams	assaying	2.17% copper
Concentrate	22 "	"	8.00% "
Tails	78 "	"	0.29% "

The recovery, based on 22 grams recovery of concentrate showed an extraction of 81.1% of the copper content of the ore.

A run was made on 2000 grams of copper sulphide ore from Pool's mine, of Virgilina, Va., with the No. 1 reagent. This ore assayed 4.36% copper, and the result of the test was as follows:

Heads	2000 grams	assaying	4.36%	copper
Concentrate	165.1 "	"	41.3%	"
Middlings	473.5 "	"	3.34%	"
Tails	1344.7 "	"	0.23%	"

The recovery of copper in the concentrates and middlings was 84 grams, showing an extraction of 96.3% of the copper content of the ore.

In a test in which the reagent was composed of pitch, caustic soda, carbonate of soda, sodium oleate and a small proportion of alum, was used on 50 grams of a carbonate ore from the Navajo mine, assaying 8.94% copper, the flotation resulted in a concentrate of 12 grams assaying 24.25% copper, middings 18 grams showing 5.76% copper, tails 20 grams containing 1.91% copper. The extraction based on concentrates and middlings showed 88.3%.

~~C L A I M S~~

K.V.W.C.S Having now particularly described ascertained the nature of the said invention & the manner in which the same is to be performed we declare that what we claim is:

1. A reagent for use in the concentration of ores, which comprises liquefied vegetable pitch.

2. A reagent for use in the concentration of ores, which comprises liquefied wood pitch.

3. A reagent for use in the concentration of ores, which comprises liquefied rosin pitch.

4. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and a pitch reagent.

5. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and an alkali.

6. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and a caustic alkali.

7. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch and a combination of alkalies.

8. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch, an alkali and a salt.

9. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch, an alkali and a salt of the alkali.

10. A composition of matter for use in the concentration of ores, which comprises the reaction product of

rosin pitch and a combination of alkalies.

11. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, an alkali and a salt.

12. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, an alkali and a salt of the alkali.

13. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and caustic soda.

14. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda and a sodium salt.

15. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and ammonia.

16. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, a caustic alkali and ammonia.

17. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda and ammonia.

18. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, a salt and ammonia.

19. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda, a sodium salt and ammonia.

20. A composition of matter for use in the concentration of ores, which comprises the reaction product

of rosin pitch, caustic soda, sodium carbonate and ammonia.

21. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with an alkali.

22. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with a caustic alkali.

23. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda.

24. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a salt.

25. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a sodium salt.

26. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a plurality of sodium salts.

27. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and a coal tar derivative with an alkali.

28. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and a coal tar derivative

with caustic soda.

29. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda.

30. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda and a sodium salt.

31. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda and sodium silicate.

32. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution.

33. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of a base.

34. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of an alkali.

35. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of a caustic alkali.

36. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of caustic soda.

37. The method of making a reagent for use in the concentration of ores, which comprises making an alkaline solution, adding an oxidizing agent to the solution, and adding pulverized rosin pitch to the mixture.

the pulp.

45. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing a liquid decomposed rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

46. The process of concentrating ore, which comprises mixing the ore with water to form a pulp, introducing colloidal liquefied rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

47. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an emulsifying reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

48. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an alkaline reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

49. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an alkali into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

50. The process of concentrating ore, which comprises mixing finely divided ore, with water, to form a pulp, introducing the reaction product of rosin pitch and a caustic alkali reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

51. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and a caustic soda reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

52. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of caustic soda and rosin pitch, and a metallic silicate into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

53. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of caustic soda and rosin pitch, and sodium silicate into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

54. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleaginous material.

55. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with a mineral oil.

56. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with a combination of mineral oils.

57. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with coal tar.

58. A composition of matter for use in the concen-

tration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with the coal tar creosote.

59. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with coal tar and coal tar creosote.

60. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleaginous material and silicate of an alkaline metal.

61. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleanginous material and silicate of soda.

62. A composition of matter, which comprises the reaction product of rosin pitch, and oleaginous material and a common neutralizing agent.

63. A composition of matter, which comprises the reaction product of rosin pitch, a mineral oil and a common neutralizing agent.

64. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and a common neutralizing agent.

65. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote and a common neutralizing agent.

66. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and an alkali.

67. A composition of matter, which comprises the reaction product of rosin pitch, and a caustic alkali.

68. A composition of matter, which comprises the reaction product of rosin pitch, and caustic soda.

69. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and a common neutralizing agent, and a silicate of an alkaline metal.

70. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and a common neutralizing agent, and silicate of soda.

71. A composition of matter, which comprises the reaction product of rosin pitch, a mineral oil and a common neutralizing agent, and silicate of soda.

72. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and a common neutralizing agent, and silicate of soda.

73. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and an alkali, and silicate of soda.

74. A composition of matter, which comprises the reaction product of rosin pitch, a causticalkali, and silicate of soda.

75. A composition of matter, which comprises the reaction product of rosin pitch, caustic soda, and silicate of soda.

76. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing an oleaginous material with the first mixture.

77. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch

84. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch in an aqueous solution of caustic soda, adding permanganate of potash to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture.

85. The methods of making a frothing and mineral gathering material, which comprises mixing rosin pitch in an aqueous solution of caustic soda, adding permanganate of potash to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture, and adding sodium silicate to the mixture.

86. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized rosin pitch and an oleaginous material to the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

87. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized rosin pitch and an oleaginous material, and a silicate of an alkaline metal to the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

88. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized rosin pitch and an oleaginous material, and silicate of soda to the pulp, aerating the pulp to form a froth and separating the froth from the pulp.

89. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a mineral oil in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

90. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a mineral oil in a neutralized rosin pitch, and silicate of soda into the pulp, aerating the pulp to form a froth, separating the froth from the pulp.

91. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a combination of mineral oils in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

92. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a combination of mineral oils in a neutralized rosin pitch, and silicate of soda into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

93. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

94. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar in a neutralized

the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

100. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of water-gas tar coal tar and coal tar creosote in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

3. The applicants therefore apply for leave to file a specification of the invention pursuant to Part I. of the Mysore Inventions and Designs Regulation, 1894.

Luckenbach Processes Incorporated
by J Harry de L Cebrian Pres

Corporate Seal

We, Luckenbach Processes, Incorporated, the applicants above named do declare that what is stated in this Application is true to our knowledge, except as to matters stated on information and belief, and as to those matters we believe them to be true.

Corporate Seal

Luckenbach Processes Incorporated
by Harry de L Cebrian
Pres.

J+C 94-21-2

Duplicate.

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 436
2. Date of Remittance 12-9-21
3. From whom received Messrs H.V. Williams & Co, Calcutta
4. Date of receipt of amount in the General and Revenue Secretariat 16-8-21
5. On what account Appl fee for Invn No 17072 1-22 by Lee Kem Gobb Processes incorporated Sagg Francisco
6. Amount (in figures and words) Rs 10/- Rupees ten only
7. The head to which it should be credited. -

(To be filled in by the Treasury.)

for Secretary to Government,
A&S General Department.

The above amount has been duly received and credited in the Treasury on this date.

Date

Hd. Acctt. Treasurer. Try. Officer.

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

Vide G.M. 131-20/22

G. R. S. VI.—s-v/16]

DRAFT. (17-21)

44

SUBJECT.....

.....

.....

Section. 94c
File No. 94-21
Serial No. 3

Diary No. of letter replied to.....

No. IC1799/21

To

The Secy., Bd. of Sc. Advice

.....

.....

GENERAL AND REVENUE SECRETARIAT,

( )

, *the*.....*191*

Has the honor to forward herewith

the opinion of the Board

Date of issue.....17/9/21.....

for ~~report~~ under Sec. 6, Cl. (2) of the

Signed by.....M.V.N.S.R.....

Mysore Inventions and Designs Regulation, XI of 1894, an application for leave to file a specification of an invention for

"Reagent for concentrating ore by flotation and method & process of using the same" by Lockenbach Processes Incorporated, Manufacturers, 57, Post Street, San Francisco, California, U.S.A.

By Order,

M.S.R.
12/9/21

~~for~~ Secretary to Government.
Gl. Asst

45

G. I

14700

I & C. 94-21-4

Board of Scientific Advice.

[T

NO. 114 Ends 1 Appx

2450

11-11-21

Bangalore, Dated 10-11- 1921.

FROM

S. G. SASTRY, ESQ., B.A., M.Sc., (LOND.) F.C.S.,
SECRETARY, BOARD OF SCIENTIFIC ADVICE,
BANGALORE.

11 NOV 1921

TO

B. Ramaswamaiya, Esq., B.A., B.L.,
Secretary to Government,
General Department,
Bangalore.

SIR,

Ref:- I & C. 1799/I & C 94-21-3 dated 17-9-21.

With reference to the above, I am directed to state that the application referred to above does not contain drawings meant to illustrate the invention. I am to request you therefore to kindly obtain the same from the applicants without which the application cannot be considered. The application is returned herewith.

I have the honour to be
Sir,
Your most obedient servant,

S. G. Sastry

Secretary.

N. B.—Should routine notes be written on small slips, the notes must be copied, or slips pasted on this form.

G. R. S. III—3]

ROUTINE NOTES.

[To be used only for notes, requisitions, etc., not intended for permanent record]

N. B.-- Should routine notes be written on small slips, the notes must de copied, or slips pasted on this form.

W D 1880- GPB—1,50 000- 2 5-21

46

G. R. S. VI—G/32]

SUBJECT.....

.....

.....

*Diary No. of letter replied to*_____

General and Revenue Secretariat

( )

, *the* *191*

Date of issue 24/11/21

Signed by _____

Section 9 & C

File No. 94-21

Serial No. 5

No. 3066/ore

To

Messrs H. V. Williams & Co.,
Patent Agents & Engineers,
8, Esplanade East,
Calcutta.

Gentlemen,

With reference to your letter dated 11th August 1921 forwarding an application for a patent in Mysore in the name of Luckenbach Processe Incorporated for their invention for "Reagent for ——— concentrations of ore by floation and method and process of using the same", I am directed to state that the ——— application referred to does not contain drawings meant to illustrate the ———

over.

P 20

invention and to request that the same may be forwarded at an early date. The application is returned herewith for reference and retransmission:

I have etc

Foreign Agent, Geneva

List of enclosures.

Copied by

Examined by

27361

D 2838
8.12.21

48

GEN & REV. SECTT.
8 - DEC 1921

8 Esplanade East,
Calcutta,
2nd December, 1921.

From.

H. V. Williams & Co.,
Patent Agents & Engineers,
Calcutta.

To.

The Secretary,
Government of His Highness the Maharaja of Mysore,
General & Revenue Secretariat,
Bangalore.

Sir,

Re. Luckenbach Process Inc.,
Mysore Application.

With reference to your letter dated the 24th November, we have the honour to resubmit this application and regret that sheet 3 was not withdrawn from the specification before same was filed.

We have now cancelled page 3 as same is not required and beg to request that the process may be considered without reference to drawings.

We have the honour to be,
Sir,
Your most obedient servants,

H. V. Williams & Co.

17-12-21 [illegible]

47

G. R. S. VI—G/32]

SUBJECT.....

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.....

Diary No. of letter replied to.....

General and Revenue Secretariat

( )

, the *191* .

Date of issue 23/12/21

Signed by [illegible]

Section P & C

File No. 94-21

Serial No. 7

No. 3620/2

To The Secretary, Board of Scientific Advice.

With reference to correspondence ending with his letter no 1114 dt 10-11-21. regarding the application for leave to file a Specification of an invention for 'Reagent for concentrations of ore by flotation and method & process of using the same' by Luckenbach Processes, Incorporated, has the honor to forward herewith a copy of letter dated dt 2-12-21 received from Messrs H.V. Williams & Co, Calcutta, in their name & together with

over.

P.T.O.

5)

Her application for ~~favour of~~ necessary

action.

B. O.

17/12/21

List of enclosures.

Copied by

Examined by

6249 94-94-21-8. 51

Board of Scientific Advice.

Bangalore, Dated. 29th April *1922.*

8 May –

NO. 57-25 Encl:

FROM

S. G. SASTRY, ESQ., B.A., M.Sc., (LOND.) F.I.C.

SECRETARY, BOARD OF SCIENTIFIC ADVICE.

BANGALORE.

GEN. & REV. SECRETARIAT 4967 9 MAY 1922 INDUSTRIES & COMMERCE BRANCH.

9 MAY 1922

TO

S. Hiriannaiya, Esq., M.A., B.L.,
General Secretary to Government of
His Highness the Maharaja of Mysore,
Bangalore.

SIR,

Ref: Your No.IC 3630/I&C 94-21-7 dated 23-12-21.

With reference to the above, I am directed to state that the specification of an invention contained therein may be granted. The application is returned herewith.

I have the honour to be,

Sir,

Your most obedient servant,

S. G. Sastry

Secretary.

6375

52

9 & C 94-21-9

8 Esplanade East,

Calcutta,

8th May, 1922.

To.

16 MAY 1922

The Secretary to the Government of

His Highness the Maharajah of Mysore,

General Department,

General & Revenue Secretariat,

BANGALORE.

GEN. & REV. SECRETARIAT 5081. 16 MAY 1922 INDUSTRIES & COMMERCE. BRANCH.

Sir,

Re. Luckenbach Processes Inc.

Mysore patent application.

We have the honour to request that we may receive the orders passed on this case

We would say that a corresponding patent has been granted in British India and we enclose a copy of the accepted specification.

Thanking you in anticipation.

We have the honour to be,

Sir,

Your most obedient servants,

H.V. Williams & Co

Submd

The draft order granting leave to file a specification in respect of the invention has been approved and is ready either.

AHS 20-5-22

20/5/22

53

GOVERNMENT OF INDIA.

THE PATENT OFFICE,
1, COUNCIL HOUSE STREET, CALCUTTA.

SPECIFICATION

No. 6285. 29th September 1920.

ACCEPTED 15TH AUGUST 1921.

REAGENT FOR CONCENTRATION OF ORE BY FLOTATION AND METHOD OF MAKING AND PROCESS OF USING THE SAME.

LUCKENBACH PROCESSES, INCORPORATED, A CORPORATION OF THE STATE OF NEVADA, OF 57 POST STREET, SAN FRANCISCO, CALIFORNIA, UNITED STATES OF AMERICA, MANUFACTURERS.

The following specification particularly describes and ascertains the nature of the invention and the manner in which the same is to be performed.

The invention relates to the concentration of ores for the recovery of the valuable mineral content thereof from the valueless earthly or rocky gangue with which they are associated in nature, by the flotation process, wherein the ore in finely divided state is mixed with water to form a pulp, which is then aerated or gasified in the presence of a material which will form bubbles in the water to which mineral particles will adhere, and be floated to the surface of the pulp and from a froth thereon, while the gangue will not be acted on by the material, or will be repelled thereby, and will sink to the bottom. The mineral bearing froth is removed from the surface, and the values are recovered.

The present invention is based on the discovery of new frothing and mineral gathering agents, and combinations or mixtures of the same, by means of which a higher percentage of recovery of values than in the present flotation processes may be secured. The present invention is applicable to all of the mineral compounds capable of concentration by the flotation processes at present in use, and by its use it is possible to recover certain free or native metals, and the carbonates, oxides and silicates of certain metals, as well as the sulphides thereof.

In addition to recovering metallic minerals and their compounds, certain non-metallic minerals, such for example, as graphite, elemental sulphur, etc., may be floated and concentrated.

The object of the invention is to provide a simple cheap and efficient reagent which may be introduced directly into the pulp without previous agitation, which will have a high preferential affinity for the mineral content of the ore, will produce a thick, heavy, close grained, tenacious froth which will float the mineral particles to the surface of the pulp, and which will not only float the mineral compounds recoverable by the oil flotation processes, but will act on metals and mineral compounds which cannot be floated by the oil flotation processes at present in use.

A further object is to produce a frothing reagent which may be employed in connection with the oily gathering materials of the oil flotation processes, which is cheaper than the frothing oils at present employed, and which by its own gathering properties will assist in the gathering operation to a greater extent than do the frothing oils at present in use.

Price: EIGHT ANNAS.

These and further objects will more fully appear in the following specification and claims.

The invention involves the use of rosin pitch, or wood tar pitch, or combinations of two or more pitches in a colloidal solution, as the frothing and gathering agent.

Pitch, as defined in this specification, is a solid residuum from the dry or destructive distillation of rosin, or of wood tar, and may, it is believed, be obtained from all kinds of wood, but the preferred pitch is that resulting from the destructive distillation of the rosin which is itself the residue of the steam distillation of pine latex.

In the practice of the invention the pitch is dissolved by mixing the same with a pitch solvent. As far as at present known, any solvent of rosin pitch may be employed. The following substances have been employed with good results: Caustic soda, caustic potash, the carobonates and bicarbonates of sodium and potassium, ammonia, the salts of ammonium and the phosphates of sodium and potassium in combination with certain of the foregoing, carbon di-sulphide, alcohol, acetone and various combinations of the same.

The proportions of the pitch and the solvent may vary within wide limits as depends upon the kind of ore to be concentrated, and for different grades or different compounds of the same ore.

The preferred solvent is an aqueous solution of caustic soda, or of caustic soda and carbonate of soda. The soda solution is first made, and a small proportion of rosin pitch is boiled in the solution until the mixture is reduced to a syruplike consistency. This mixture may be termed the stock solution, and may be thinned by the addition of hot water to the consistency required in, what may be called, the reagent for use in the pulp.

In making up the frothing and selecting composition or mixture, a reagent solution is first prepared. This solution is formed by dissolving an alkali, preferably caustic soda, in water. To the alkali water is preferably added a metallic salt, such for example as carbonate of soda, phosphate of soda, etc.

If desired, and in some situations it may be preferable, the alkali may be omitted, and the water treated with salt alone. In this case the more or less alkalinity of the salt will be relied upon to render the solution alkaline, it being understood that a greater amount of the salt will be required than when the caustic soda is employed in the mixture.

If desired, an oxidizing agent may be added to the stock solution during its compounding. Such an oxidizing agent is peroxide of hydrogen, and a small proportion of a weak solution of the same in water, added to the pitch-alkali mixture before or during the boiling will cause the pitch to more readily go into solution and increases the frothing and gathering qualities of the reagent.

For working some forms of ore, such for example as those carrying iron compounds which are not desired in the concentrate, ammonia, or its compounds, may be added to the pitch-soda mixture. The ammonia will add to the alkalinity of the reagent, and in connection with certain ores the proportion of soda may be reduced, or the soda eliminated. When ammonia is employed in addition to the soda or soda salt, it, the ammonia, may be placed directly in the pulp before, during, or after, the introduction of the soda-pitch mixture.

When ammonia without caustic soda is employed as the pitch solvent, a small proportion of a solution of permanganate of potash is preferably added to the solvent. The permanganate of potash has an oxidizing effect in the solution, and in connection with ammonia causes rapid dissemination of the pitch.

Ammonia in the pulp affects iron compounds to such an extent that their affinity for the reagent is weakened or destroyed, depending on the amount of ammonia employed. Ammonia also has strong gangue repellant qualities and when used a cleaner concentrate will be recovered.

The ammonia content of the reagent may be varied to suit different ores and to make preferential selections. If the ore under consideration comprises, for example, zinc together with iron compounds in which there are no zinc values, the ammonia content of the reagent may be such that the iron will be repelled with the gangue and only the zinc values will be raised. If, on the other hand, zinc values appear in, or mechanically attached to, the iron

compounds, the ammonia content of the reagent, or ammonia in the pulp, may be diminished or even omitted. The iron compounds may then be floated with the zinc and be separated therefrom by a subsequent operation.

The proportions of the various ingredients in the reagent may be varied within wide limits. The reagent may be compounded in concentrated form for economy in transportation and may be diluted as required. The operator will know by the appearance of the froth on the surface of the pulp as to the quantity of the reagent required. If the froth is thin, weak and watery, or if the froth is lightly mineralized, the proportion of the reagent to the pulp must be changed.

In making up the reagent above described, a minute proportion of silicate of soda may be added during the compounding, or the same may be added to the complete reagent mixture, or to the pulp before, during, or after, the reagent is added. The silicate of soda acts to prevent the silicious gangue from floating with the mineral values, and will also tend to keep any iron compound, which may be present, from rising.

While the reagent above described is free of oil, or oleaginous material, it may be used in conjunction with such materials, and its use as a frothing agent in connection with any of the well known oils or oily substances of the oil flotation processes is superior to the frothing oils at present.

When used with an oily gathering agent, such for example as a mixture of coal tar and coal tar creosote, the tarry mixture may be beaten into the pulp as is common, and the frother comprising the reagent of the invention, may be added to the pulp as desired. This is a distinct improvement over present oil flotation processes for the reason that in the latter the frothing oil must be beaten into the pulp to form an emulsion, and it is highly impracticable to beat the gathering oil into the pulp and subsequently beat in the frothing oil. It is necessary, therefore, to place the gathering and frothing oils in the pulp, or the water of the pulp, together and there is no way in which the proportions of the frothing and gathering oils can be changed after the oiled pulp is formed.

As the reagent of this application is in a colloidal, or semi-colloidal condition, and is miscible in water it may, therefore, be added to the water of the pulp at any time before or during the flotation operation. This is particularly advantageous, as if during a run the froth should show an undesirable change, the supply of the frother can be adjusted to bring it to the desired state without stopping the run to permit of placing a new mixture of frothing and gathering material in the pulp. By the use of the reagent of this application as a frother, the mixture of collector and frother may be made in the pulp at any step of the process. The pitch reagent not only acts as the frothing agent in the process but, because of its selective properties, it will aid materially in the gathering operation.

If desired, the pitch reagent may be added to the oil or oily gathering agent before introduction into the flotation apparatus. In such a mixture the oil or oily substance or substances will be broken up, into a colloidal or semi-colloidal state, and the entire mixture will be miscible in water, and may be added to the pulp without previous agitation or beating, and it will be necessary to agitate the pulp only to the extent necessary to distribute the ore throughout the water whereby the reagent may contact with all of the ore particles.

The employment of the pitch reagent in conjunction with the oils of the present flotation processes will not only produce the advantages above described, but will impart to the oil or oily substance the added quality of selecting and gathering native metals, carbonates, oxides and silicates as well as the sulphides of the metals.

A general indication or approximation of the proportions of the various ingredients of the reagent is as follows :—

No. 1, Pitch	6 oz.
Caustic soda solution	1½ pints.

The reagent solution is preferably made by dissolving 8 oz. of caustic soda in 2 gallons of water.

The mixture is boiled until the pitch has become liquefied, and the mass has the consistency of syrup. The syrup-like liquid may be thinned as desired to form the working mixture. As an extremely small quantity of the active

56

material (pitch) is required in the flotation process, the thinner the working mixture the easier it will be to measure the active material placed in the pulp. If the working mixture be in concentrated form, as above, the amount used per ton of ore must be measured in cubic centimeters, while if the mixture be diluted enough, it may be measured in larger quantities and nicety of measuring will not be required.

If desired, an oxidizing agent, such for example as hydrogen peroxide, may be added to the above reagent. This will cause rapid dissemination of the pitch, and a cleaner concentrate will be secured.

Instead of caustic soda as the pitch solvent, a salt of such alkaline metal, such as sodium carbonate, or a mixture of the alkali and the salt, may be used.

When ammonia is employed as the pitch solvent, the following is the general or approximate formula :—

No. 2	Pitch	2 oz.
	Ammonia (12½ per cent)	1½ oz.
	Permanganate of Potash sol.	1 oz.
	Water	4 oz.

Heat and mix thoroughly until the pitch is dissolved, and dilute with hot water to the consistency desired.

The permanganate of potash solution may be made by dissolving 8 grams of permanganate of potash in 1 quart of hot water.

In making a frothing and gathering reagent by the use of an oil or oily substance the following example with coal tar and coal tar creosote as the oil, is given, it being understood that any of the known gathering oils or combinations of the same may be employed instead of coal tar and creosote :—

No. 3	Coal tar	5 cc.
	Coal tar creosote	5 cc.
	Pitch	15 grams.
	Caustic soda	5 grams.
	Silicate of soda	2½ cc.
	Water	200 cc.

The caustic soda is dissolved in the water and the silicate of soda is added. The coal tar and creosote are mixed. The pitch is added to the soda solution and the mixture is boiled until the pitch is liquefied. This mixture is allowed to cool. The mixture of tar and creosote is stirred into the mixture and when it is thoroughly mixed, the mass is diluted by the admixture of 200 cc of water. The tar and creosote may be added to the cool pitch mixture, but it is preferable to make the addition while the pitch mixture is still warm. This is the frothing and gathering reagent.

Instead of using coal tar or coal tar creosote, as in example No. 3, water-gas tar may be employed as follows :—

No. 5,	Pitch	50 grams.
	Water-gas tar	30 cc.
	Caustic soda	10 cc.
	Silicate of soda	2·5 cc.
	Water	1 liter.

The water-gas tar, pitch and caustic soda are melted together and hot water is added slowly. The silicate of soda may be melted with the other ingredients, but is preferably added after the hot water.

Carbonate of soda may be used instead of caustic soda in which case 20 cc will be used. If both caustic and carbonate are employed the proportions may be 5 cc of the former and 10 cc of the latter.

The water-gas tar may be used in addition to coal tar and creosote or with either in about equal proportions.

Any of the above reagents may be acidified by the addition of a 10 per cent. solution of a mild acid, such for example as boric acid.

The pitch in all of the examples given, while dissolved and in liquid form is not in true solution, but is in what may be termed a colloidal or semi-colloidal solution as distinguished from a true solution. The exact condition and state of the mixture is not known to applicant's inventor, and the above theory is to the best of his present knowledge and belief.

In use an extremely small quantity of the active material is added to the pulp and apparently the smaller the amount of the active material, within certain limits, the better will be the extraction.

The density of the pulp may vary. In working some ores it may be 2½ parts water to 1 part ore, while with others it may be as high as 5 or 6 parts water to 1 part of ore.

Instead of boiling the ingredients of the reagent mixture as above described, the operation may be carried out without heating the ingredients, and the latter process is preferable when ammonia or other highly volatile substance is employed as, or in, the pitch solvent.

In the flotation process the greater part of the active ingredients of the reagent will be carried up with the bubbles formed, and will be in the concentrate removed from the flotation apparatus. The said active materials may be separated from the concentrates, and be reused in the process.

Some of the active material will probably remain in the water of the pulp and be carried off with the tailings. The gangue may be separated from the water and the latter reused in the process, in which case a smaller proportion of reagent need be added to the new pulp.

The water which has been employed in making the reagent and the pulp is the tap water of the Borough of Brooklyn in the City and State of New York, United States of America. Service water of the City of Toronto in the Dominion of Canada has also been employed with the same results, and it is believed that any water of reasonable purity may be used.

In making up the No. 1 and No. 2 reagents as above, the addition of a small quantity of sodium silicate will have an effect on the gangue which will, to a great extent, prevent said gangue from being raised with the values, and a cleaner concentrate will be produced.

By adding a small quantity of sodium stearate or similar salt to the No. 1 and No. 2 reagents, such mixtures will be capable of raising carbonates, oxides and silicates of the metals, as well as the sulphides.

If desired, a small proportion of alum may be added to any of the above reagents with beneficial results in working certain ores.

A small proportion of casein, dissolved in a slightly alkaline water, may be added to any of the above reagents. The casein apparently has a suspending effect on the solid or colloidal matters in the mixture, and prevents precipitation.

As an example of the results obtained in the flotation process of the present invention, the No. 3 reagent was used with 1,500 grams of a chalcopyrite and bornite copper ore from the Dergy mine, of Virgilina, in the State of Virginia, United States of America, with a pulp composed of ore 1 part, and water 4 parts, in a Janney test machine on a run of 15 minutes duration. The result was as follows :—

	Weight. Grams.	Per cent. Cu.	Con. Grams.	Per cent. of Total.
Heads	1500·00	4·08	61·20	100
1st concentrate . . .	122·80	44·05	54·09	88·3
2nd concentrate . . .	34·80	12·11	4·21	6·8
Middlings	270·20	·65	1·76	2·8
Tails	1070·60	·08	·86	1·4
Recovery	1498·40	...	60·92	97·9

This test showed a total concentration of 97·9 per cent. copper.

The machine used has a capacity for one third of the pulp operated on and pulp was put through in three batches, three runs for each batch. The machine was washed between each batch which accounts for the loss of 0·7 per cent. of the copper which adhered to the machine and in the pipes and was washed out. In a larger machine a portion, at least, of these lost values would have been recovered in the concentrates.

In a test in which the No. 1 reagent was modified by using 30 grams of carbonate of soda instead of the caustic soda, on a sample of surface ore from the Navajo mine near Flagstaff in the State of Arizona, United States of

58

America. This ore carries carbonate of copper but no sulphides of copper. The test was made using 100 grams of ore in a Janney laboratory machine, and showed the following result:—

Heads	4·21	per cent. copper.
Concentrate	14·38	„ „
Tails	0·128	„ „

The recovery, in the concentrate was 28 grams, and the extraction therefor indicates a recovery of 95·6 per cent. of the copper content of the ore.

A test run on 100 grams of the same ore, and using the No. 2 reagent produced the following result :—

Heads	100 grams	assaying	2·17	per cent. copper.
Concentrate	22 „	„	8·00	„ „
Tails	78 „	„	0·29	„ „

The recovery, based on 22 grams recovery of concentrate showed an extraction of 81·1 per cent. of the copper content of the ore.

A run was made on 2,000 grams of copper sulphide ore from Pool's mine, of Virgilina, in the State of Virginia, United States of America, with the No. 1 reagent. This ore assayed 4·36 per cent. copper, and the result of the test was as follows:—

Heads	2,000 grams	assaying	4·36	per cent. copper.
Concentrate	165·1 „	„	41·3	„ „
Middlings	473·5 „	„	3·34	„ „
Tails	1344·7 „	„	0·23	„ „

The recovery of copper in the concentrates and middlings was 84 grams, showing an extraction of 96·3 per cent. of the copper content of the ore.

In a test in which the reagent was composed of pitch, caustic soda, carbonate of soda, sodium oleate and a small proportion of alum, was used on 50 grams of a carbonate ore from the Navajo mine assaying 8·94 per cent. copper, the flotation resulted in a concentrate of 12 grams assaying 24·25 per cent. copper, middlings 18 grams showing 5·76 per cent. copper, tails 20 grams containing 1·91 per cent. copper. The extraction based on concentrates and middlings showed a recovery of 88·3 per cent.

We claim :

1. A reagent for use in the concentration of ores by flotation, consisting of a pitch residuum from the dry or destructive distillation of rosin, or of wood tar.

2. A reagent as claimed in Claim 1, combined with a reagent therefor, such as caustic alkali or a combination of alkalies, or with an alkali or combination of alkalies and a salt of an alkaline metal.

3. The use as a reagent in the concentration of ores by flotation of the reaction product of pitch and ammonia, with or without the addition of an alkali, and with or without the addition of a salt of an alkaline metal such as sodium carbonate, or a combination of salts.

4. The use as a reagent in the concentration of ores by flotation of any of the combinations claimed in Claims 2 and 3 with an oil or combination of oils.

5. The use as a reagent in the concentration of ores by flotation of any of the combinations claimed in Claims 2 and 3 with coal tar or a coal tar derivative such as coal tar creosote or both.

6. The method of making a reagent for use in the concentration of ores by flotation, which comprises adding pulverized rosin pitch to an aqueous solution of an alkali such as caustic soda, with or without an oxidizing agent such as permanganate of potash.

7. The method of making a reagent for use in the concentration of ores by flotation which consists in pulverizing a reagent as claimed in Claim 1 and placing the same in an aqueous solution or ammonia with or without an oxidizing agent such as permanganate of potash.

8. The method of making such a reagent by mixing pulverized rosin pitch with an aqueous pitch solvent such as sodium hydroxide with or without an oxidizing material such as permanganate or potsh, and adding a mineral oil such for example as coal tar or coal tar creosote or both to the pitch mixture, with or without the addition of a salt of an alkali such as silicate of soda.

G. R. S. VI—G/32]

SUBJECT.....

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.....

Diary No. of letter replied to 5021

General and Revenue Secretariat

( )

, *the* 191 .

Date of issue 9-6-1922

Signed by Mr. S.N.A.

Section 94

File No. 94-21

Serial No. 101

No. 6045/Encl. 1

To Messrs A.V. Williams & Co
Patent Agents & Engineers
8, Esplanade East
Calcutta.

Gentlemen,

With reference to correspondence ending with your letter dt 8-5-22 regarding the application for leave to file a specification of an invention for 'Reagent for concentrations of ore by floation and method and process of using the same' by Luckenbach Processes, Incorporated, I am directed to state that it is reported in the application submitted on 11-8-1921 that no application has at any time

over.

P.T.O.

8/6/22

been made for a patent in the United Kingdom or in British India in respect of the invention, but the copy of the Specification dt 29-9-1920 forwarded with your letter of 8-5-1922 shows that the same has been accepted by the Govt of India on 15-8-1921. ~~I am~~ The original application is therefore returned herewith for necessary correction & resubmission ~~for orders of Govt~~.

Yours faithfully.

25/5 Secy to Govt, Genl Dept.

28/5/22

List of enclosures.

Copied by

Examined by

65763

62

94c
~~94c~~ 94-21-11

8 Esplanade East,

Calcutta

16th June, 1922.

GEN. & REV. SECRETARIAT
5557
20 JUN 1922
INDUSTRIES & COMMERCE
BRANCH.

94c
JUN 1922

The Secretary to the Government of

H. H. The Maharaja of Mysore,

General Department,

BANGALORE.

Sir,

We have the honour to acknowledge receipt of your favour of the 9th June, together with the application from Luckenbach Processes Incorporated, for leave to file the specification of their invention for "Reagent for Concentration of ore by floation and method and process of using the same", and regret that by an oversight reference to the corresponding Indian was not inserted therein.

We now forward fresh form with the required information duly filled up therein.

We have the honour to be,

Sir,

Your most obedient servants,

H. V. Williams & Co

Rose Lane, Kent.

Dear Sir,

I shall be glad

to have the Contract for the Decoration and

Furnishing of the Drawing Room and Dining Room

at the above address.

Yours faithfully,

Edward Lawrence.

DUNGARVAN.

Painted Decorations,

H. H. the Maharajah of Dungarvan,

Furnished to the Corporation and

APPLICATION

THE APPLICATION of LUCKENBACH PROCESSES, Incorporated, a corporation organized under the laws of the State of Nevada, with offices at 57 Post Street, San Francisco, California, United States of America, Manufacturers.

The applicants are in possession of an invention for "Reagent for concentration of ore by floation and method and process of using the same", they are the assigns of the inventor thereof; and to the best of their information and belief, the invention is new within the meaning of Part 1 of The Inventions and Designs Regulations, 1894, and no circumstance exists which, if the applicants are authorized to file a specification and file it in accordance with that Part, will disentitle them to an Exclusive privilege thereunder in respect of the invention, for which an application for a patent has been made in British India, No. 6285 dated the 29th day of September 1920, see Gazette of India dated the 9th October 1920.

The following is a description of the invention:-

(1)
9+c9421
64

APPLICATION

THE APPLICATION of LUCKENBACH PROCESSES, Incorporatod, a corporation organized under the laws of the State of Nevada, with offices at 57 Post Street, SanFrancisco California, United States of America, Manufacturers.

The applicants are in possession of an invention for "Reagent for concentrations of ore by floation and method and process of using the same" they are the assigns of the ~~assignee~~ inventor thereof; and to the best of their information and belief, the invention is new within the meaning of Part 1 of The Inventions and Designs Regulations, 1894, and no circumstance exists which, if the applicants ~~be~~ are authorized to file a specification and file it in accordance with that Part, will disentitle them to an Exclusive privilege thereunder in respect of the invention: for which ~~no~~ an application for a patent has ~~at any time~~ been made ~~for a patent~~ in ~~the United Kingdom or~~ British India, ~~by or on behalf of the inventor applicants.~~ No 6285 dated the 29th day of September 1920 see Gazette of India dated the 9th October 1920.

The following is a description of the invention:-

G. R. S.VI—s.-v/21]

Government of Mysore.

GENERAL DEPARTMENT.

Register No. 17 **of 1921-22**

no. 6428/ffe. 94-21-12

Bangalore, the 30 6 *1922*

WHEREAS an application, dated the ..... and received on the 14th August 1921, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Luckenbach Processes, Incorporated, a corporation organized under the laws of the State of Nevada, with offices at 57 Post Street San Francisco, California, United States of America, Manufacturers (hereinafter referred to as "the applicant") for leave to file a specification of an invention for "Reagent for concentrations of ore by floation and method and process of using the same"

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

16/5/22

for Secretary to the Govt. of Mysore,
General Department.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the Twenty Second day of July 1922

9.9.22

for Secretary to the Govt. of Mysore,
General Department.

(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

W D 02300—GPB - 500—24-11-16

G. R. S. VI—s-v/13]

DRAFT.

SUBJECT.....

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Section. 94c
File No. 94-21
Serial No. 13

No. 6429/Ere 1

Diary No. of letter replied to.....

To

Messrs H. V. Williams & Co
Patent Agents & Engineers,
8, Esplanade, East,
Calcutta.

GENERAL AND REVENUE SECRETARIAT,
( )
, the.....*191*

GENTLEMEN,

With reference to your letter ~~No.~~ correspondence ending with

dated the ~~2nd December~~ 14-6-1922 ~~1921~~.

Date of issue 30. 6 22

I am directed to forward herewith G. O.

Signed by Mr. M. S. R. Rao

No. G./G. M. dated the.....

191 , authorizing Luckenbach Processes, Incorporated, 57 Post Street, San Francisco, California, United States of America

to file a specification of an invention for 'Reagents for concentrating of ore by flotation & method and process of using the same'

and to request that the fact may be communicated to the party concerned.

I have, etc.

for Secretary to Government.

M. gatpat. 826/20-21

(20)

67. 371.

9+c 94-21-14

67

8 Esplanade East,

Calcutta,

18th July, 1922.

No. 599.

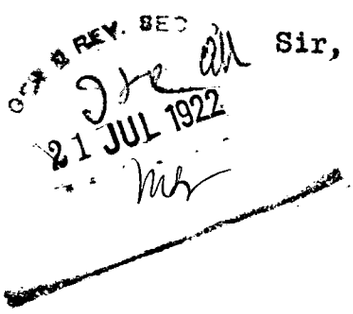
To.

The Secretary to Government,

of Mysore,

General Department,

BANGALORE.



Sir,

Re. Luckenbach Processes Inc.,

No. 17 of 1921-1922.

"Reagent for concentration of ore by flotation".

With reference to your letter dated the 30th June, we have the honour to forward under separate cover, copies of the specification of this invention.

We also enclose the order authorizing the filing of the specification and request that same be returned to us with the certificate at the foot thereof relating to the filing duly completed.

We forward by Money Order the sum of Rs. 30/- in connection with the matter.

We have the honour to be,

Sir,

Your most obedient servants,

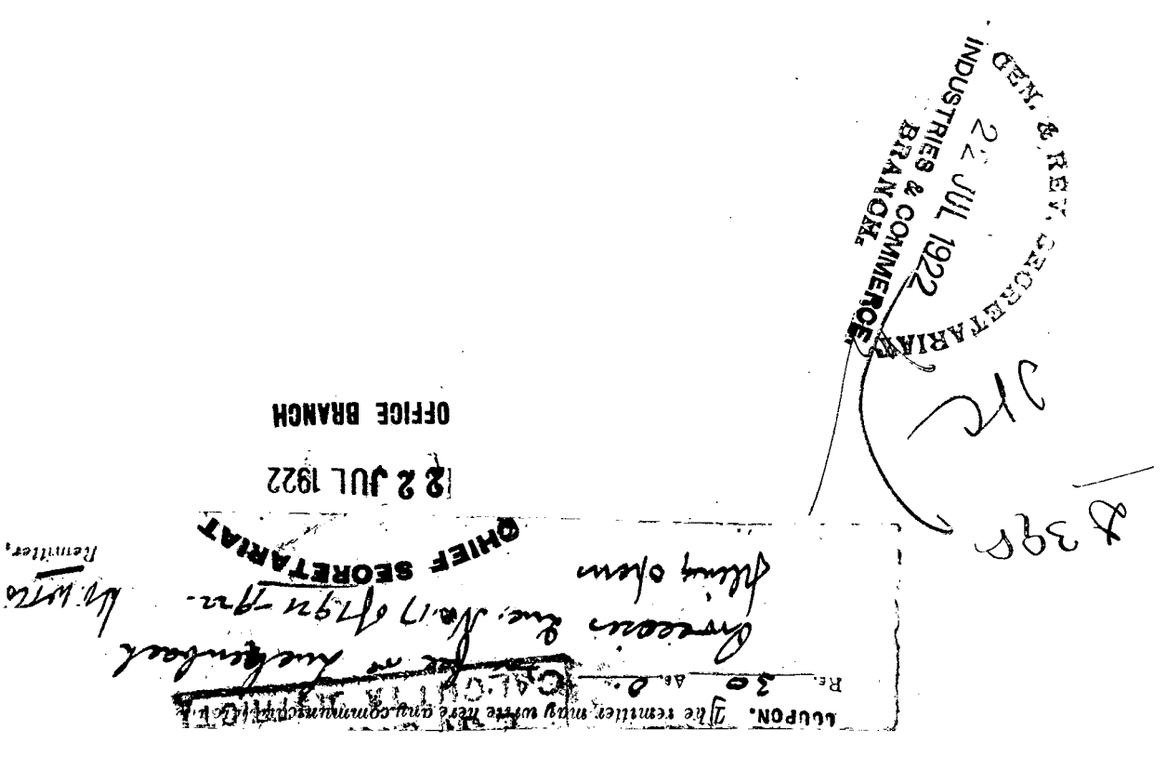
A. V. Williams & Co

NOTE.—The following certificate must be signed in all cases. If the Bill bears date within the 15th of the month, the word "current" may be changed to "last." The Treasury Officer shall refuse to encash a bill unless the proper certificate is signed.

I certify that my Detailed Contingent Bill for all contingent charges drawn by me prior to the 1st of the current month has been forwarded on with all necessary vouchers to the Head of my Department for countersignature and transmission to the Comptroller of Mysore.

Dated

The 19 Signature and Office of Disbursing Officer.



Finl. 22] ABSTRACT CONTINGENT BILL.

NOTE.—If this Bill is headed with any other month than that in which it is presented for payment, or if the certificate overleaf regarding submission of detailed Bills is not signed, the Treasury Officer must return it for correction or for the requisite certificate.

Government of Mysore	Bill for Contingent Charges of	Month of
Head of Service		Voucher No.
Nos. of Sub-Vouchers	Description of Charge and date of authority (where special sanction is necessary)	Amount

		* Rs.	a.	p.	Rs.	a.	p.
The total of this Bill must be entered in both words and figures							
	In words Rupees ...						

* This column should, when charges are described, exhibit the component parts of the detailed head. The total of each detailed head will be entered in the next column.

N. B.—The Treasury Officer will make payments on this form as often as required, but the drawer should be careful to include in the Detailed Contingent Bill of a month only the amount of all abstracts encashed at the Treasury during the month.

Dated Received Contents.

The 19 Drawing Officer.

G. R. S. VI—G/32]

SUBJECT.....

.....

.....

Diary No. of letter replied to 371.

General and Revenue Secretariat

( )

the *191*

Date of issue 5. 8. 1922.

Signed by Mr. N S R Row

Section 9 & C

File No. 94-21.

Serial No. 15

No. 926/Genl.

To

Messrs H. V. Williams & Co
Patent Agents & Engineers
9 Esplanade, East
Calcutta.

Gentlemen,

I am directed to state that

C copies of specification of an invention no 17 of 1921-22 for "Reagent for concentration of ore by floation and method ~~of making~~ and process of using the same" do not contain the full information found in the Copy of the specification submitted with your letter dated 2-12-21 vide pages 16 and ~~onwards~~ thereof. I am to request that copies of the specification

V

over.

P.T.O.

13

which are herewith returned, maybe

~~return~~ revised and resubmitted ~~for~~

~~adjutant~~ at an early date

I have etc

Wm Pym

Actg Asst Surgeon Genl.

VCS

List of enclosures.

Copied by

Examined by

9922

GEN. & REV. DEPT.
14 AUG 1922
REV. SECRETARIAT
14 AUG 1922
INDUSTRIES & COMMERCE BRANCH

9 & C 95-21-16

71

8 Esplanade East,

Calcutta,

8th August, 1922.

To

The Secretary to the Government of
His Highness the Maharaja of Mysore,
General Department,
BANGALORE

Sir,

Re. Luckenbach Processes.

We have the honour to acknowledge receipt of your letter of the 5th August, and would say that the specifications have been drawn to agree identically with that accepted in India.

We regret that we have now no copies of the specification as originally filed and would request that the duplicate copy filed in your office be returned to us to enable us to make the necessary copies for filing.

We have the honour to be,

Sir,

Your most obedient servants,

H. V. Williams & Co

Date,

12

G. R. S. VI—G/32]

SUBJECT.....

.....

.....

Diary No. of letter replied to.....

General and Revenue Secretariat

( )

, *the* *191*

Date of issue 21.8.1922

Signed by [illegible] C.A.G

Section Pats

File No. 94-21

Serial No 17

No. 1243/Genl

To

Messrs. H.V. William & Co.

8. Esplanade East, Calcutta.

Sirs,

As requested in your letter 8/8/22, I am directed to forward herewith the duplicate of the specification as originally filed, and to request that the same may be returned.

When done with,

I have etc

[illegible]

17/8/22 for Genl Secy

Ker

[illegible]

over.

H. V. WILLIAMS,
MEMBER,
CHARTERED INSTITUTE
OF
PATENT AGENTS, LONDON.

BANKERS:
CHARTERED BANK OF INDIA,
AUSTRALIA AND CHINA;
LONDON AND CALCUTTA.

Our Reference No. .....
Your Reference No. .....

H. V. Williams & Co.,

Patent Agents & Engineers,
8, Esplanade East,

CABLES AND TELEGRAMS:—
"LOFZANG," CALCUTTA.
CODES: { A. B. C. 5TH EDITION,
PATENTS, B SINGER'S.

Telephone No. 1170.

73

I & C 94-21-18.

16221

CALCUTTA, 26th August, 1922.

D 1093
31 8 22

GEN. & REV. SECRETARIAT
31 AUG 1922
INDUSTRIES & CO...
BRANCH...

31 AUG 1922 To.

The Secretary to Government,
General Department,
BANGALORE.

Sir,

We have the honour to acknowledge receipt of your letter of the 21st inst., enclosing duplicate of the specification as originally filed for which we thank you.

We return same herewith with five copies of the specification agreeing with the specification originally filed.

We have the honour to be,
Sir,
Your most obedient servants,

H. V. Williams & Co

26th August,

To.

The Secretary to Government,

General Department,

BANGALORE.

Sir,

We have the honour to acknowledge receipt of your letter of the 21st inst., enclosing duplicate of the specification on originally filed for which we thank you.

We return herewith with five copies of the specification requiring with the specification originally filed.

We have the honour to be,

Sir,

Your most obedient servants,

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that we, Luckenbach Processes, Incorporated, a Corporation of the State of Nevada, of 57 Post Street, San Francisco, California, United States of America, Manufacturers, are in possession of an invention for "Reagent for concentration of ore by flotation and method of making and process of using the same", and we, the said Luckenbach Processes, Incorporated, do hereby declare the nature of the said invention and in what manner the same is to be performed, to be particularly described and ascertained by the following statement.

Mr. Wells

~~S P E C I F I C A T I O N~~

The invention relates to the concentration of ores for the recovery of the valuable mineral content thereof from the valueless earthly or rocky gangue with which they are associated in nature, by the flotation process, wherein the ore in finely divided state is mixed with water to form a pulp, which is then aerated or gasified in the presence of a material which will form bubbles in the water to which mineral particles will adhere, and be floated to the surface of the pulp and form a froth thereon, while the gangue will not be acted on by the material, or will be repelled thereby, and will sink to the bottom. The mineral bearing froth is removed from the surface, and the values are recovered.

The present invention is based on the discovery of new frothing and mineral gathering agents, and combinations or mixtures of the same,

by means of which a higher percentage of recovery of values than in the present flotation processes may be secured. The present invention is applicable to all of the mineral compounds capable of concentration by the flotation processes at present in use, and by its use it is possible to recover certain free or native metals, and the carbonates, oxides and silicates of certain metals, as well as the sulphides thereof.

In addition to recovering metallic minerals and their compounds, certain non-metallic minerals, such for example, as graphite, elemental sulphur, etc., may be floated and concentrated.

The object of the invention is to provide a simple cheap and efficient reagent which may be introduced directly into the pulp without previous agitation, which will have a high preferential affinity for the mineral content of the ore, will produce a thick, heavy, close grained, tenacious froth which will float the mineral particles to the surface of the pulp, and which will not only float the mineral compounds recoverable by the oil flotation processes, but will act on metals and mineral compounds which cannot be floated by the oil flotation processes at present in use.

A further object is to produce a frothing reagent which may be employed in connection with the oily gathering materials of the oil flotation processes, which is cheaper than the frothing oils at present employed, and which by its own gathering properties will assist in the gathering operation to a greater extent than do the frothing oils

of soda. The soda solution is first made, and a small proportion of rosin pitch is boiled in the solution until the mixture is reduced to a syrup-like consistency. This mixture may be termed the stock solution, and may be thinned by the addition of hot water to the consistency required in, what may be called, the reagent for use in the pulp.

In making up the frothing and selecting composition or mixture, a reagent solution is first prepared. This solution is formed by dissolving an alkali, preferably caustic soda, in water. To the alkali water is preferably added a metallic salt, such for example as carbonate of soda, phosphate of soda, etc.

If desired, and in some situations it may be preferable, the alkali may be omitted, and the water treated with salt alone. In this case the more or less alkalinity of the salt will be relied upon to render the solution alkaline, it being understood that a greater amount of the salt will be required than when the caustic soda is employed in the mixture.

If desired an oxidizing agent may be added to the stock solution during its compounding. Such an oxidizing agent is peroxide of hydrogen, and a small proportion of a weak solution of the same in water, added to the pitch-alkali mixture before or during the boiling will cause the pitch to more readily go into solution and increases the frothing and gathering qualities of the reagent.

For working some forms of ore, such for

example as those carrying iron compounds which are not desired in the concentrate, ammonia, or its compounds, may be added to the pitch-soda mixture. The ammonia will add to the alkalinity of the reagent, and in connection with certain ores the proportion of soda may be reduced, or the soda eliminated. When ammonia is employed in addition to the soda or soda salt, it, the ammonia, may be placed directly in the pulp before, during, or after, the introduction of the soda-pitch mixture.

When ammonia without caustic soda is employed as the pitch solvent, a small proportion of a solution of permanganate of potash is preferably added to the solvent. The permanganate of potash has an oxidizing effect in the solution, and in connection with ammonia causes rapid dissemination of the pitch.

Ammonia in the pulp affects iron compounds to such an extent that their affinity for the reagent is weakened or destroyed, depending on the amount of ammonia employed. Ammonia also has strong gangue repellant qualities and when used a cleaner concentrate will be recovered.

The ammonia content of the reagent may be varied to suit different ores and to make preferential selections. If the ore under consideration comprises, for example, zinc together with iron compounds in which there are no zinc values, the ammonia content of the reagent may be such that the iron will be repelled with the gangue and only the zinc values will be raised. If, on the other

hand, zinc values appear in, or mechanically attached to, the iron compounds, the ammonia content of the reagent, or ammonia in the pulp, may be diminished or even omitted. The iron compounds may then be floated with the zinc and be separated therefrom by a subsequent operation.

The proportions of the various ingredients in the reagent may be varied within wide limits. The reagent may be compounded in concentrated form for economy in transportation and may be diluted as required. The operator will know by the appearance of the froth on the surface of the pulp as to the quantity of the reagent required. If the froth is thin, weak and watery, or if the froth is lightly mineralized, the proportion of the reagent to the pulp must be changed.

In making up the reagent above described a minute proportion of silicate of soda may be added during the compounding, or the same may be added to the complete reagent mixture, or to the pulp before, during, or after, the reagent is added. The silicate of soda acts to prevent the silicious gangue from floating with the mineral values, and will also tend to keep any iron compound, which may be present, from rising.

While the reagent above described is free of oil, or oleaginous material, it may be used in conjunction with such materials, and its use as a frothing agent in connection with any of the well known oils or oily substances of the oil flotation processes is superior to the frothing oils at present in use.

If desired the pitch reagent may be added to the oil or oily gathering agent before introduction into the flotation apparatus. In such a mixture the oil or oily substance or substances will be broken up, into a colloidal or semi-colloidal state, and the entire mixture will be miscible in water, and may be added to the pulp without previous agitation or beating, and it will be necessary to agitate the pulp only to the extent necessary to distribute the ore throughout the water whereby the reagent may contact with all of the ore particles.

The employment of the pitch reagent in conjunction with the oils of the present flotation processes will not only produce the advantages above described, but will impart to the oil or oily substance the added quality of selecting and gathering native metals, carbonates, oxides and silicates as well as the sulphides of the metals.

A general indication or approximation of the proportions of the various ingredients of the reagent is as follows.

No. 1. Pitch ----------6 oz.

Caustic sode solution 1-1/2 pints

The reagent solution is preferably made by dissolving 8 oz. of caustic soda in 2 gallons of water.

The mixture is boiled until the pitch has become liquefied, and the mass has the consistency of syrup. The syrup-like liquid may be thinned as desired to form the working mixture. As an extremely small quantity of the active material (pitch) is

by the use of an oil or oily substance the following example with coal tar and coal tar creosote as the oil, is given, it being understood that any of the known gathering oils or combinations of the same may be employed instead of coal tar and creosote.

No. 3 Coal tar ---------- 5 cc
Coal tar creosote ------ 5 cc
Pitch ---------- 15 grams
Caustic soda ---------- 5 grams
Silicate of soda ------- 2-1/2 cc
Water----------200 cc

The caustic soda is dissolved in the water and the silicate of soda is added. The coal tar and creosote are mixed. The pitch is added to the soda solution and the mixture is boiled until the pitch is liquefied. This mixture is allowed to cool. The mixture of tar and creosote is stirred into the mixture and when it is thoroughly mixed, the mass is diluted by the admixture of 200 cc of water. The tar and creosote may be added to the cool pitch mixture, but it is preferable to make the addition while the pitch mixture is still warm. This is the frothing and gathering reagent.

Instead of using coal tar or coal tar creosote, as in example No. 3, water-gas tar may be employed as follows:

No. 5. Pitch ---------- 50 grams
Water-gas tar ------- 30 cc
Caustic soda -------- 10 cc
Silicate of soda ---- 2.5 cc
Water ---------- 1 liter

The water-gas tar, pitch and caustic soda are melted together and hot water is added slowly. The silicate of soda may be melted with the other ingredients, but is preferably added after the hot water.

Carbonate of soda may be used instead of caustic soda in which case 20 cc will be used. If both caustic and carbonate are employed the proportions may be 5 cc of the former and 10 cc of the latter.

The water-gas tar may be used in addition to coal tar and creosote or with either in about equal proportions.

Any of the above reagents may be acidified by the addition of a 10% solution of a mild acid, such for example as boric acid.

The pitch in all of the examples given, while dissolved and in liquid form is not in true solution, but is in what may be termed a colloidal or semi-colloidal solution as distinguished from a true solution. The exact condition and state of the mixture is not known to applicant's inventor, and the above theory is to the best of his present knowledge and belief.

In use an extremely small quantity of the active material is added to the pulp and apparently the smaller the amount of the active material, within certain limits, the better will be the extraction.

The density of the pulp may vary. In working some ores it may be 2-1/2 parts water to 1 part ore, while with others it may be as high as 5 or 6

parts water to 1 part of ore.

Instead of boiling the ingredients of the reagent mixture as above described, the operation may be carried out without heating the ingredients, and the latter process is preferable when ammonia or other highly volatile substance is employed as, or in, the pitch solvent.

In the flotation process the greater part of the active ingredients of the reagent will be carried up with the bubbles formed, and will be in the concentrate removed from the flotation apparatus. The said active materials may be separated from the concentrates, and be reused in the process.

Some of the active material will probably remain in the water of the pulp and be carried off with the tailings. The gangue may be separated from the water and the latter reused in the process, in which case a smaller proportion of reagent need be added to the new pulp.

The water ~~which has been~~ employed in making the reagent and the pulp is the tap water of the Borough of Brooklyn in the City and State of New York, United States of America. Service water of the City of Toronto in the Dominion of Canada has also been employed with the same results, and it is believed that any water of reasonable purity may be used.

In making up the No. 1 and No. 2 reagents as above, the addition of a small quantity of sodium silicate will have an effect on the gangue which will, to a great extent, prevent said gangue from

97.9% copper.

The machine used has a capacity for one third of the pulp operated on and pulp was put through in three batches, three runs for each batch. The machine was washed between each batch which accounts for the loss of 0.7% of the copper which adhered to the machine and in the pipes and was washed out. In a larger machine a portion, at least, of these lost values would have been recovered in the concentrates.

In a test in which the No. 1 reagent was modified by using 30 grams of carbonate of soda instead of the caustic soda, on a sample of surface ore from the Navajo mine near Flagstaff ~~in the State~~ of Arizona, ~~United States of America~~. This ore carries carbonate of copper but no sulphides of copper. The test was made using 100 grams of ore in a Janney laboratory machine, and showed the following result.

Heads	4.21% copper
Concentrate	14.38% "
Tails	0.128% "

The recovery, in the concentrate was 28 grams, and the extraction therefor indicates a recovery of 95.6% of the copper content of the ore.

A test run on 100 grams of the same ore, and using the No. 2 reagent produced the following result.

Heads	100 grams	assaying	2.17%	copper
Concentrate	22 "	"	8.00%	"
Tails	78 "	"	0.29%	"

Having now particularly described and ascertained the nature of the said invention and the manner in which the same is to be performed, We declare that what we claim is:-

1. A reagent for use in the concentration of ores, which comprises liquefied vegetable pitch.

2. A reagent for use in the concentration of ores, which comprises liquefied wood pitch.

3. A reagent for use in the concentration of ores, which comprises liquefied resin pitch.

4. A composition of matter for use in the concentration of ores, which comprises the reaction product of wood pitch and a pitch reagent.

5. A composition of matter for use in the concentration of ores, which comprises the reaction product of resin pitch and an alkali.

6. A composition of matter for use in the concentration of ores, which comprises the reaction product of resin pitch and a caustic alkali.

7. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch and a combination of alkalies.

8. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch, an alkali and a salt.

9. A composition of matter for use in the concentration of ores, which comprises the reaction product of a pitch, an alkali and a salt of the alkali.

10. A composition of matter for use in the concentration of ores, which comprises the reaction product of resin pitch and a combination of alkalies.

11. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, an alkali and a salt.

12. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, an alkali and a salt of the alkali.

13. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and caustic soda.

14. A composition of matter for use in the concentration of ores, which comprises the reaction product or rosin pitch, caustic soda and a sodium salt.

15. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch and ammonia.

16. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, a caustic alkali and ammonia.

17. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda and ammonia.

18. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, a salt and ammonia.

19. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda, a sodium salt and ammonia.

20. A composition of matter for use in the concentration of ores, which comprises the reaction product of rosin pitch, caustic soda, sodium carbonate and ammonia.

21. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with an alkali.

22. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with a caustic alkali.

23. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda.

24. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a salt.

25. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a sodium salt.

26. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch and an oil with caustic soda and a plurality of sodium salts.

27. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and a coal tar derivative with an alkali.

28. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and a coal tar derivative with caustic soda.

A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda.

50. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda and a sodium salt.

51. A frothing and gathering composition for use in the concentration of ores, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote with caustic soda and sodium silicate.

52. A [illegible] The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution.

53. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of a base.

54. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of an alkali.

55. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of a caustic alkali.

56. The method of making a reagent for use in the concentration of ores, which comprises liquefying rosin pitch in an aqueous solution of caustic soda.

57. The method of making a reagent for use in the concentration of ores, which comprises making an alkaline solution, adding an oxidizing agent to the solution, and adding pulverized rosin pitch to the mixture.

58. The method of making a reagent for use in the concentration of ores, which comprises making a caustic soda solution, adding hydrogen peroxide to the solution, and adding pulverized rosin pitch to the mixture.

59. The method of making a reagent for use in the concentration of ores, which comprises making a caustic soda solution, adding permanganate of potash to the solution, and adding pulverized rosin pitch to the mixture.

60. The method of making a reagent for use in the concentration of ores, which comprises making an [illegible] solution, adding permanganate of potash to the solution, and adding pulverized rosin pitch to the mixture.

61. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

62. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing liquefied rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

63. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing an aqueous solution of rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

44. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing deoxygenated rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

45. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing a liquid deoxygenated rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

46. The process of concentrating ore, which comprises mixing the ore with water to form a pulp, introducing colloidal liquefied rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

47. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an emulsifying reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

48. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an alkaline reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

49. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and an alkali into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

60. The process of concentrating ore, which comprises mixing finely divided ore, with water, to form a pulp, introducing the reaction product of rosin pitch and a caustic alkali reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

61. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of rosin pitch and a caustic soda reagent into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

62. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of caustic soda and rosin pitch, and a metallic silicate into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

63. The process of concentrating ore, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of caustic soda and rosin pitch, and sodium silicate into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

64. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleaginous material.

65. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with a mineral oil.

97

56. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with a combination of mineral oils.

57. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with coal tar.

58. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with the coal tar creosote.

59. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with coal tar and coal tar creosote.

60. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleaginous material and silicate of an alkaline metal.

61. A composition of matter for use in the concentration of ores, comprising reducing rosin pitch to liquid form, and mixing the liquefied pitch with an oleaginous material and silicate of soda.

62. A composition of matter, which comprises the reaction product of rosin pitch, and oleaginous material and a common neutralizing agent.

63. A composition of matter, which comprises the reaction product of rosin pitch, a mineral oil and a common neutralizing agent.

64. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and a common neutralizing agent.

65. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and coal tar creosote and a common neutralizing agent.

66. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and an alkali.

67. A composition of matter, which comprises the reaction product of rosin pitch, and a caustic alkali.

68. A composition of matter, which comprises the reaction product of rosin pitch, and caustic soda.

69. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and a common neutralizing agent, and a silicate of an alkaline metal.

70. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and a common neutralizing agent, and silicate of soda.

71. A composition of matter, which comprises the reaction product of rosin pitch, a mineral oil and a common neutralizing agent, and silicate of soda.

72. A composition of matter, which comprises the reaction product of rosin pitch, coal tar and a common neutralizing agent, and silicate of soda.

73. A composition of matter, which comprises the reaction product of rosin pitch, an oleaginous material and an alkali, and silicate of soda.

74. A composition of matter, which comprises the reaction product of rosin pitch, a caustic alkali, and silicate of soda.

76. A composition of matter, which comprises the reaction product of rosin pitch, caustic soda, and silicate of soda.

76. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing an oleaginous material with the first mixture.

77. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing a mineral oil with the first mixture.

78. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing coal tar with the first mixture.

79. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing coal tar and coal tar creosote with the first mixture.

80. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of pitch solvent, and mixing equal parts of coal tar and coal tar creosote with the first mixture.

81. The method of making a frothing and mineral gathering material, which comprises mixing rosin pitch with an aqueous solution of a pitch solvent, and mixing equal parts of coal tar and coal tar creosote with the first mixture, and a salt.

64. The method of making a frothing and mineral gathering material, which comprises mixing resin pitch in an aqueous solution of caustic soda, adding an oxidizing agent to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture.

65. The method of making a frothing and mineral gathering material, which comprises mixing resin pitch in an aqueous solution of caustic soda, adding an oxidizing agent to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture, and adding sodium silicate to the mixture.

66. The method of making a frothing and mineral gathering material, which comprises mixing resin pitch in an aqueous solution of caustic soda, adding permanganate of potash to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture.

67. The methods of making a frothing and mineral gathering material, which comprises mixing resin pitch in an aqueous solution of caustic soda, adding permanganate of potash to the mixture, and adding equal parts of coal tar and coal tar creosote to the mixture, and adding sodium silicate to the mixture.

68. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized resin pitch and an oleaginous material to the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

87. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized rosin pitch and an oleaginous material, and a silicate of an alkaline metal to the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

88. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of neutralized rosin pitch and an oleaginous material, and silicate of soda to the pulp, aerating the pulp to form a froth and separating the froth from the pulp.

89. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a mineral oil in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

90. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction produc combination of mineral oils in a neutralized pitch into the pulp, and silicate of soda in pulp, aerating the pulp to form a froth, sep the froth from the pulp.

91. The process of concentrating ores, comprises mixing finely divided ore with wat form a pulp, introducing the reaction produc combination of mineral oils in a neutralized pitch into the pulp, aerating the pulp to fo

froth, and separating the froth from the pulp.

92. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of a combination of mineral oils in a neutralized resin pitch, and silicate of soda into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

93. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

94. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar in a neutralized rosin pitch, and silicate of soda into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

95. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar creosote in a neutralized rosin pitch into the pulp, aerating the pulp to form a froth, and separating the froth from the pulp.

96. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of coal tar and coal tar creosote in a neutralized rosin pitch and silicate of soda into the pulp, aerating the pulp to

form a froth, and separating the froth from the pulp.

97. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of equal parts of coal tar and coal tar creosote in a neutralized resin pitch and silicate of soda into the pulp, agitating the pulp to form a froth, and separating the froth from the pulp.

98. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of watergas tar in a neutralized resin pitch into the pulp, agitating the pulp to form a froth, and separating the froth from the pulp.

99. The process of concentrating ores, which comprises mixing finely divided ore with water, to form a pulp, introducing the reaction product of watergas tar in a neutralized resin pitch and silicate of soda into the pulp, agitating the pulp to form a froth, and separating the froth from the pulp.

100. The process of concentrating ores, which comprises mixing finely divided ore with water to form a pulp, introducing the reaction product of watergas tar coal tar and coal tar creosote in a neutralized resin pitch into the pulp, agitating the pulp to form a froth, and separating the froth from the pulp.

Dated this 17th day of July, 1907.

H. V. Williams & Co

Agents for the Applicants.

Fee 94-21-18A Duo 1093.

164

Duplicate.

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 545

2. Date of Remittance 11-9-22

3. From whom received Messrs A.V. Williams & Co, Calcutta

4. Date of receipt of amount in the General and Revenue Secretariat 22-9-22

5. On what account Diluip fee in respect of Inventions Nos 17 & 18 of 1922-23

6. Amount (in figures and words) Rs 30/- Rupees thirty only

7. The head to which it should be credited.

(To be filled in by the Treasury.)

M Ramchandra Rao
Secretary to Government,
General Department.

No 15

The above amount has been duly received and credited in the Treasury on this date.

Date 11-9-1922

A. Narayana Rao
Hd. Acctt. *Treasurer.* Kommuri Rao
Try. Officer.

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

G. R. S. VI—G/32]

SUBJECT.....

.....

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Diary No. of letter replied to 1093.

General and Revenue Secretariat

( )

the 191

Date of issue 18th September 1922

Signed by Mr. M. S. R. Row

Section 9 & c

File No. 94-21.

Serial No 18 B

No. 1782

Notification

(Patent)

The following Specification of an invention (No 17 of 1921-22) has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The Inventions & Designs Regulation) and is open to inspection at the Mysore Government Secretariat on application to the Secretary to Govt. of His Highness the Maharaja of Mysore, General Dept and on payment of one rupee.

By Luckenbach - Processes, Incorporated, a corporation organized

over.

~~under the Laws~~ of the State of Nevada,

with offices at 57 Post Street, San Francisco,

California, United States of America,

Manufacturers

" Reagent for concentration

of ore by flotation and method and

process of using the same."

By order

[signature]

Secretary to Govt.

Govt. Office.

To The compiler, Mysore Gazette; for publication.

List of enclosures.

Copied by

Examined by

3 dft

9 Fe 94-21-19 107

G. R. S. VII—s-v/18]

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE.

GENERAL AND REVENUE SECRETARIAT.

Dated Bangalore, 8th Sept 1922.

No. 1783 / Exes. 2

FROM

The Secretary to the Government of H. H. the Maharaja of Mysore, Genl

To Messrs A.V. Williams & Co, Calcutta

Sir,

With reference to your letter dated 26-8-22 I am directed to forward copy of a Notification No. dated issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.)

The order granting permission to file specification is herewith returned' with the certificate at foot, duly filled in and signed.

I have the honor to be,
Sir,
Your most obedient servant,

MRS 9/9

for Secretary to Government. Genl

WD 02297—GPB—250—4-2-18